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10/591,945	09/08/2006	Hiroshi Fujisawa	1752-0187PUS1	8000

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EXAMINER	
IEVA, NICHOLAS	

ART UNIT	PAPER NUMBER
2836	

NOTIFICATION DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/591,945	FUJISAWA ET AL.	
	Examiner	Art Unit	
	Nicholas Ieva	2836	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 August 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,4,6-8,10,11 and 13-21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,4,6-8,10,11 and 13-21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *08 August 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☒ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *09/24/2007*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. **Claims 1, 4, 6-8, 10 and 11** are objected to because of the following informalities: the eighth and ninth lines of claim 1, the fourth line of claim 4, and the last line in claims 6-8, 10 and 11 include the phrase "in a/the depth direction". Examiner has reason to believe that Applicant intends to mean "from a/the side cross-sectional view" when he mentions the phrase "depth direction", and the examination of these claims will be based on this interpretation.

2. **Claim 7** is objected to because of the following informalities: the second line of claim 7 includes the phrase "curb configuration". Examiner has reason to believe that Applicant intends to mean "a mesh configuration" when he mentions the phrase "curb configuration", because both the description and drawings refer back to a mesh type configuration when the applicant discloses what a curb configuration is. The examination of these claims will be based on this interpretation.

3. **Claim 14** is objected to because of the following informalities: the claim contains a reference character (z) that is not in parentheses. Reference characters corresponding to elements recited in the detailed description of the drawings and used in conjunction with the recitation of the same element or group of elements in the claims should be enclosed within parentheses so as to avoid confusion with other numbers or characters which may appear in the claims. See MPEP § 608.01(m).

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. **Claims 1, 4, 6 and 14** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

6. Regarding **claim 1**, the phase "in the order of distance from the sample attracting plane in a depth direction of the insulation material" and "in which the area that is not overlapped is crossed a plurality of times" renders this claim indefinite because it is unclear what limitations these phases bring to the claimed invention. For the purpose of applying prior art to this claim, the phase "in the order of distance from the sample attracting plane in a depth direction of the insulation material" is being interrupted to mean "when the sample attracting plane is viewed from a side cross-sectional view" and the phase "in which the area that is not overlapped is crossed a plurality of times" is going to be ignored.

7. Regarding **claims 4, 6, and 14**, the phrase "band-like comb teeth configuration" renders the claim(s) indefinite because the claim(s) include(s) elements not actually disclosed (those encompassed by "band-like configuration"), thereby rendering the scope of the claim(s) unascertainable. See MPEP § 2173.05(d). For the purpose of applying prior art to these claims, the phase "band-like comb teeth configuration" is going to mean any group of electrodes that when combined resembles a comb like structure.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

10. **Claims 1, 4, 6, 13, 15, 16, 020, and 21** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Shamouilian et al. (US 5,646,814)**, which was supplied in the applicant's information disclosure statement, in view of **Shirosaki (JP 092923775 A)**.

Consider **claim 1**, Shamouilian et al. discloses a bipolar electrostatic chuck which has a first electrode **24** and a second electrode **22** in an interior of

an insulating material **26**, generates at least an attracting performance by a gradient force, and attracts a sample by allowing a surface of the insulating material to function as a sample attracting plane, characterized in that:

the insulating material **26** is formed by laminating an upper insulating layer **26c**, the first electrode **24**, an interelectrode (middle) insulating layer **26b**, the second electrode **22**, and a lower insulating layer **26a** when the sample attracting plane is viewed from a side cross-sectional view; and

when the sample attracting plane is viewed from a side cross-sectional view, the second electrode has an area that is not overlapped with the first electrode, and a plurality of first and second electrodes (Shamouilian; figure 2b; column 2, lines 54-61; column 4, lines 34-62; column 3, line 56 – column 4, line 20; column 5, lines 60-67).

However, Shamouilian does not specifically disclose that the first and second electrodes are alternately arranged.

In the same field of endeavor, electrostatic chucks, Shirosaki teaches a first and second electrode **46 and 48** that is alternately arranged (Shirosaki; figure 1; abstract).

Shirosaki also mentions that his arrangement of electrodes produces a constant attration force even if the temperature of the workpiece is varied (Shirosaki; abstract).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have incorporated the teachings of Shirosaki

into the bipolar electrostatic chuck taught by Shamouilian et al., because Shirosaki's teachings would have provide an alternative arrangement for the electrodes that would have kept a constant attraction force even if the temperature of the workpiece is varied.

Consider **claim 4**, Shamouilian et al. teaches that the first electrode is formed in a band-like comb teeth configuration (a series of first electrodes that when combined resembles a comb like structure), and that the second electrode is formed in a band-like comb teeth configuration (a series of second electrodes that when combined resembles a comb like structure); when the sample attracting plane is viewed from a side cross-sectional view (Shamouilian; figure 2b; column 2, lines 54-61; column 4, lines 34-62; column 5, lines 19-59).

Furthermore, Shirosaki teaches that the first and second electrodes are alternately arranged; and that the second electrode is not overlapped with the first electrode, when the sample attracting plane is viewed from a side cross-sectional view (Shirosaki; figure 1; abstract).

Consider **claim 6**, Shamouilian et al. teaches the first electrode is formed in a band-like comb teeth configuration (a series of first electrodes that when combined resembles a comb like structure); the second electrode is formed in a plane having a given planar area; and a part of the second electrode is overlapped with the first electrode when the sample attracting plane is viewed from a side cross-sectional view (Shamouilian; figure 2b; column 2, lines 54-61; column 4, lines 34-62; column 5, lines 19-59).

Consider **claim 13**, Shamouilian et al. teaches that the distance between the first electrode **24** and the second electrode **22** is equal to or more than 1 μm and equal to or less than 100 μm or 1000 μm (Shamouilian; figure 2b; column 6, lines 16-29; claim 7; claim 43).

Consider **claim 15**, Shamouilian et al. teaches that the interelectrode (middle) insulating layer **26b** is formed of a resin layer made of polyimide (Shamouilian; figure 2b; column 6, lines 47-53; column 5, lines 61-67; column 8, lines 16-61; column 9, lines 51-63).

Consider **claim 16**, Shamouilian et al. teaches that the resin layer is formed of one resin film (polyimide) (Shamouilian; figure 2b; column 6, lines 47-53; column 5, lines 61-67; column 8, lines 16-61; column 9, lines 51-63).

Consider **claim 20**, Shamouilian et al. teaches that a sectional configuration of a part or all of the first electrode **24** taken along the depth direction of the sample attracting plane comprises a configuration selected from the group consisting of a rectangle, a square and a circle (from this view the thin, flat, circular (disked shaped) first electrode can look like a rectangle or square) (Shamouilian; figure 2b; column 5, lines 19-31).

Consider **claim 21**, Shamouilian et al. teaches that a sectional configuration of a part or all of the second electrode **22** taken along the depth direction of the sample attracting plane comprises a configuration selected from the group consisting of a rectangle, a square and a circle (from this view the thin,

flat, circular (disked shaped) second electrode can look like a rectangle or square) (Shamouilian; figure 2b; column 5, lines 19-31).

11. **Claims 7 and 8** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Shamouilian et al. (US 5,646,814)**, which was supplied in the applicant's information disclosure statement, in view of **Shirosaki (JP 092923775 A)** and **Skill et al. (US 6,431,112 B1)**.

Consider **claims 7 and 8**, Shamouilian et al. and Shirosaki disclose a bipolar electrostatic chuck above, but they do not disclose the first electrode is formed in a mesh configuration (curb configuration).

In the same field of endeavor, electrostatic chucks, Skill et al. teaches a electrode that is formed in a mesh configuration (curb configuration) having a plurality of openings each within a given area (Skill; column 7, lines 10-23).

Skill also mention that the mesh allows the insulating layer to be formed around the electrode in a strong physical interaction, thus the reducing the physical stress upon the insulating layer of the chuck during thermal cycling (Skill; column 7, lines 10-23).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have incorporated the teachings of Skill et al. into the bipolar electrostatic chuck taught by Shamouilian et al. and Shirosaki, because Skill's teachings would have reduced the physical stress an electrode puts upon the insulating layer of the chuck during thermal cycling.

12. **Claims 17 and 19** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Shamouilian et al. (US 5,646,814)**, which was supplied in the applicant's information disclosure statement, in view of **Shirosaki (JP 092923775 A)** and **Ito (US Pub. 2003/0015521)**, which was supplied in the applicant's information disclosure statement.

Consider **claims 17**, Shamouilian et al. and Shirosaki disclose a bipolar electrostatic chuck above, but they do not disclose that the interelectrode insulating layer is formed of a ceramic layer made of one or more elements selected from the group consisting of aluminum oxide, aluminum nitride, silicon carbide, silicon nitride, zirconia and titania.

In the same field of endeavor, electrostatic chucks (Ito; paragraph 0111-0113), Ito teaches an interelectrode insulating layer that is formed of a ceramic layer made of one element selected from the group consisting of aluminum oxide, aluminum nitride, silicon carbide, silicon nitride and zirconia (Ito; figures 1a and 1b; paragraph 0018, 0021-0024; 0039; 0111-0113).

It is well known that these materials have high thermal conductivity, good insulative properties, and can withstand high temperatures.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have incorporated the teachings of Ito into the bipolar electrostatic chuck taught by Shamouilian et al. and Shirosaki, because Ito's teachings would have increased the devices ability to withstand higher temperatures because these materials have a higher thermal conductivity.

Consider **claim 19**, Ito teaches an electrically conductive layer that is further formed on the surface of the insulating material; and the surface of the electrically conductive layer is capable of serving as the sample attracting plane (Ito; claim 18).

13. **Claims 17 and 18** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Shamouilian et al. (US 5,646,814)**, which was supplied in the applicant's information disclosure statement, in view of **Shirosaki (JP 092923775 A)** and **Shufflebotham et al. (WO 97/23945)**, which was supplied in the applicant's information disclosure statement.

Consider **claims 17**, Shamouilian et al. and Shirosaki disclose a bipolar electrostatic chuck above, but they do not disclose that the interelectrode insulating layer is formed of a ceramic layer made of one or more elements selected from the group consisting of aluminum oxide, aluminum nitride, silicon carbide, silicon nitride, zirconia and titania.

In the same field of endeavor, electrostatic chucks, Shufflebotham et al. teaches an interelectrode insulating layer that is formed of a ceramic layer made of silicon nitride (Shufflebotham; page 9, lines 5-14).

Shufflebotham also mentions that the use of a nitride as a preferred coating is selected because it gives the device an abrasion resistant surface which protects the electrodes, it has a high dielectric constant which improves the clamping force applied to the workpiece, and it has a high breakdown voltage (Shufflebotham; page 9, lines 7-14).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have incorporated the teachings of Shufflebotham et al. into the bipolar electrostatic chuck taught by Shamouilian et al. and Shirosaki, because Shufflebotham's teachings would have improved the clamping force applied to the workpiece.

Consider **claims 18**, Shufflebotham et al. teaches that the interelectrode insulating layer is formed of silicon dioxide (Shufflebotham; page 9, lines 7-14).

14. **Claim 10** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Shamouilian et al. (US 5,646,814)**, which was supplied in the applicant's information disclosure statement, in view of **Shirosaki (JP 092923775 A)** and **Yasushi (JP 2004-031594)**, which was supplied in the applicant's information disclosure statement.

Consider **claims 10**, Shamouilian et al. and Shirosaki disclose a bipolar electrostatic chuck above, but they do not disclose that the first electrode centers on a circular portion having a given circular area, has a plurality of first annular portion that are concentrically disposed at a given interval, and has a first connection portion that connects the circular portion and the first annular portions to each other; and the second electrode has a plurality of second annular portions having a width smaller than the interval which are concentrically disposed, is formed to have a second connection portion that connects the second annular portions to each other, the first annular portions and the second annular portions being alternately disposed when the sample attracting plane is viewed from a side cross-sectional view.

In the same field of endeavor, electrostatic chucks, Yasushi teaches a first electrode **4a** that centers on a circular portion having a given circular area, has a plurality of first annular portion that are concentrically disposed at a given interval, and has a first connection portion that connects the circular portion and the first annular portions to each other; and a second electrode **4b** that has a plurality of second annular portions having a width smaller than the interval which are concentrically disposed, is formed to have a second connection portion that connects the second annular portions to each other (Yasushi; figure 2; paragraph 0016).

The size and shape of the first and second electrode can vary according to the size and shape of the chuck and the workpiece, in order to maximize the area that the electrodes have in contact with the workpiece and improve the clamping force applied to a workpiece (Shamouilian; column 5, lines 19-31).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have incorporated the teachings of Yasushi into the bipolar electrostatic chuck taught by Shamouilian et al. and Shirosaki, because Yasushi's teachings would have improved the clamping force applied to a workpiece.

Furthermore, the court has held that it would have been obvious to substitute one known configuration for another in order to achieve the predictable results of maximizing the area that the electrodes have in contact with the workpiece and improving the clamping force applied to a workpiece.

15. **Claim 11** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Shamouilian et al. (US 5,646,814)**, which was supplied in the applicant's information disclosure statement, in view of **Shirosaki (JP 092923775 A)** and **Benjamin et al. (US 6,563,076 B1)**.

Consider **claims 11**, Shamouilian et al. and Shirosaki disclose a bipolar electrostatic chuck above, but they do not disclose that that the first electrode centers on a circular portion having a given circular area, has a plurality of first annular portion that are concentrically disposed at a given interval, and has a first connection portion that connects the circular portion and the first annular portions to each other; and the second electrode has a plurality of second annular portions having a width same as the interval which are concentrically disposed, is formed to have a second connection portion that connects the second annular portions to each other, the first annular portions and the second annular portions being alternately disposed when the sample attracting plane is viewed from a side cross-sectional view.

In the same field of endeavor, electrostatic chucks, Benjamin et al. teaches a first electrode **44** that centers on a circular portion having a given circular area, has a plurality of first annular portions that are concentrically disposed at a given interval, and has a first connection portion that connects the circular portion and the first annular portion portions to each other; and a second annular electrode **42** that has a width that is the same (similar) as the interval

which is concentrically disposed (Benjamin; figure 1C; column 2, line 59 – column 3, line 2).

(Shamouilian discloses a plurality of second electrodes and an interelectrode isolating layer that would have electrically isolated the first and second electrodes from one another, above.)

The size and shape of the first and second electrode can vary according to the size and shape of the chuck and the workpiece, in order to maximize the area that the electrodes have in contact with the workpiece and improve the clamping force applied to a workpiece (Shamouilian; column 5, lines 19-31).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have incorporated the teachings of Benjamin et al. into the bipolar electrostatic chuck taught by Shamouilian et al. and Shirosaki, because Benjamin's teachings would have improved the clamping force applied to a workpiece.

Furthermore, the court has held that it would have been obvious to substitute one known configuration for another in order to achieve the predictable results of maximizing the area that the electrodes have in contact with the workpiece and improving the clamping force applied to a workpiece.

16. **Claim 14** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Shamouilian et al. (US 5,646,814)**, which was supplied in the applicant's information disclosure statement, in view of **Shirosaki (JP 092923775 A)** and **Kitabayashi et al. (US 6,768,627 B1)**.

Consider **claim 14**, Shamouilian et al. and Shirosaki disclose a bipolar electrostatic chuck above,

Furthermore, Shamouilian et al. teaches that the width of the interelectrode gap (distance between the first and second electrode) is about 0.1 μm to about .1 mm or about 1 mm to about 100 mm (Shamouilian; figure 2b; column 6, lines 16-29; claim 7; claim 43).

However, they do not explicitly disclose the width (z) of the first electrode, that the width (z) of the first electrode and the width (z) of the interelectrode gap (distance between the first and second electrode) are made equal to each other, and that z is in the range of 0.15 to .5 mm.

In the same field of endeavor, electrostatic chucks, Kitabayashi et al. teaches that when one is trying to electrostatically attract a glass substrate, one sets the width of the electrodes in the range of 0.5 to 1.0mm and the width (distance) between the electrode are in the range of 0.5 to 1.0 mm (Kitabayashi; column 9, lines 32-43).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have incorporated the teachings of Kitabayashi et al. into the bipolar electrostatic chuck taught by Shamouilian et al. and Shirosaki, because Kitabayashi's teachings would have provided an alternative configuration of the widths of the electrodes and the interelectrode gap (distance between the first and second electrode) that would have been preferred when one wants to attract a glass substrate.

It would have be obvious to one of ordinary skill in the art to have picked a value of 0.5 mm for the width (z) of the electrodes and for the width (distance) (z) between the electrodes, because this value would make the width (z) of the electrodes and the width (z) between the electrodes equal to each other and have a width (z) in the range of 0.15 and 0.5 mm.

Also, It would have been obvious to one of ordinary skill in the art at the time the invention was made to have selected the overlapping portion of the range disclosed by the reference because overlapping ranges have been held to be a prima facie case of obviousness.

Conclusion

17. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. **Horwitz et al. (US 5,103,367)** teaches electrodes formed circular configuration. **Naotoshi et al. (JP 2003-179128)**, which was supplied in the applicant's information disclosure statement, teaches electrodes formed in a band-like comb teeth configuration. **Katata et al. (US 6,500,686 B2)**, which was supplied in the applicant's information disclosure statement, teaches electrodes formed circular configuration and formed in a band-like comb teeth configuration. Both **Hausmann (US 6,104,596)** and **Herchen (US Pub. 2001/0046112 A1)** teach an electrode formed in a mesh (curb) configuration. Both **Masashi et al. (JP 08-064663)** and **Koichi (JP 11-251417)**, which both were supplied in the applicant's information disclosure statement, teach an electrically conductive layer that is formed on the surface of the insulating material.

Junji (JP 2003-318251), which was supplied in the applicant's information disclosure statement, teaches an insulating layer formed of silicon.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nicholas Ieva whose telephone number is 571-270-1270. The examiner can normally be reached on M-TH (7:30am - 5pm), and F (7:30am - 4pm), EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Sherry can be reached on 571-272-2084. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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9/29/07

MICHAEL SHERRY
SUPERVISORY PATENT EXAMINER